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Richard M. Daley, Mayor

O'Hare Modernization Program

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August 25, 2004

Mr. Barry Cooper
Federal Aviation Administration
Chicago Area Modernization Program Office
Room 210
2300 East Devon Avenue
Des Plaines, Illinois 60018

Re: Jet Blast Study for OMP - Phase 1

Dear Mr. Cooper:

Enclosed is a copy of our analysis of potential jet blast impacts on specific navigational aids included in Phase 1 of the O'Hare Modernization Program (OMP). This analysis was prepared in accordance with the FAA's letter dated June 9, 2004.

Please feel free to contact me if you have any questions or require additional assistance. Thank you for your continued support of this program.

Sincerely,

Michael Boland
First Deputy Director

Enclosures

Cc: Christopher P. Arman, OMP
Shawn M. Kinder, R&A

RICONDO
& ASSOCIATES

MEMORANDUM

Date: August 26, 2004

To: Michael Boland
O'Hare Modernization Program Office

From: Shawn M. Kinder

Subject: O'HARE MODERNIZATION PROGRAM – PHASE 1
JET BLAST STUDY

Per your request, we have conducted an analysis of potential jet blast impacts on the O'Hare Modernization Program (OMP) Phase 1 navigational aids (NAVAIDs) identified in the Federal Aviation Administration (FAA) Workscope letter, dated June 9, 2004. The findings of this analysis, as well as recommendations for mitigation of jet blast issues affecting NAVAIDs in Phase 1, are discussed in the following paragraphs. OMP Phase 2 NAVAIDs identified in the workscope are currently being evaluated and results will be provided at a later date.

Introduction

As stated in the FAA workscope letter, "*The location of future NAVAIDs is critical in maintaining a safe and efficient operation not only for aircraft, but also for persons and equipment on the ground.*" In addition, FAA *Advisory Circular 150/5300-13, Airport Design*, states in Chapter 6 – Site Requirements for NAVAID and Air Traffic Control (ATC) Facilities, paragraph 600 –d, Jet Blast/Exhaust, "*NAVAIDs, monitoring devices, and equipment shelters should be located at least 300 feet (90 m) behind the source of jet blast to minimize the accumulation of exhaust deposits on antennas.*"

The Phase 1 NAVAIDs identified for evaluation in the workscope are:

- Runway 10L Glide Slope and Runway Visual Range (RVR)
- Runway 10C Glide Slope and RVR
- Runway 28C Glide Slope and RVR
- Runway 14L Temporary Localizer
- Runway 22R Localizer
- Airport Surface Observation System (ASOS) co-located with Runway 27L Glide Slope

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The future ASOS, to be sited near the future Runway 27L Glide Slope, is not expected to be relocated until Phase 2. As such, we have included this facility in the Phase 2 analysis.

In Phase 1, five taxiway intersections capable of supporting aircraft movements with the potential for jet blast impacts were identified in the vicinity of the above listed NAVAIDs. These intersections, depicted in **Exhibit** 1, are:

- Taxiway 41/Taxiway L
- Taxiway 69/Taxiway 41
- Taxiway 66/Taxiway 70
- Taxiway M/Taxiway T
- Taxiway J/ Taxiway J1

Each intersection was analyzed to determine the expected operating conditions in all airfield operating configurations and the impacts of the worst-case aircraft type and movement, regardless of whether or not it is expected to occur. The following sections detail these evaluations.

Expected Operating Conditions

The aircraft types and associated taxi movements expected in the vicinity of each intersection were identified from the OMP simulation computer model, Total Airspace and Airport Modeller (TAAM). Taxiway routes and aircraft types used in the simulation were agreed upon with FAA air traffic control at O'Hare International Airport prior to incorporation in the model and are shown on **Exhibits 2-6**. The Phase 1 fleet mix detailing aircraft type by taxiway and number of operations is contained in **Tables 1, 2** and **3** and was extracted from the "*TAAM Simulation 2009 With Project Weighted Annualized Taxiway Movement*" data.

In addition to a general review of the expected operating conditions, any specific turning movements at each intersection that have the potential to cause jet blast impacts to the nearby NAVAIDs were identified. Each intersection is discussed in detail in the paragraphs below.

In order to evaluate the effect particular aircraft types might have on an intersection in terms of jet blast, a preliminary study was conducted at the intersection of Taxiway 41/Taixway L, wherein the severity of jet blast impacts caused by the 27 different aircraft types from the Phase 1 fleet mix were evaluated. The results are contained in **Table 4**. Preliminary, Airbus A380 jet blast data indicates that this aircraft will have the most extensive 35 mph jet blast contour. However, because the preliminary data does not contain sufficient detail on

mid-range contours and due to the very low frequency of A380 operations, the Boeing B747-400 was selected as the aircraft producing the most significant jet blast impacts. The McDonnell-Douglas MD-11 would have had more severe impacts to NAVAIDs located nearby. However these aircraft do not currently operate at O'Hare International Airport and are subsequently assumed to be phased out of the fleet mix by 2009 and, therefore, were not considered for Phase 1.

Intersection of Taxiway 41/Taxiway L

The movements that could impact the RVR and Glide Slope near this intersection are an aircraft turning from Taxiway 41 east onto Taxiway L (designated on Exhibits 1-6 as LN to LE) or an aircraft turning from Taxiway L south onto Taxiway 41 (designated on Exhibits 1-6 as LW to LS). **Table 5** shows the fleet mix projected to utilize the intersection annualized over all operating configurations. The aircraft types expected to be in the vicinity are wide body cargo planes, such as the A380 or the B747-100/200 Freighter; however, as shown in Table 5, the total number of aircraft actually passing through the intersection is very small at 16.9 aircraft per day.

Simulation shows that the potential for an aircraft to turn from Taxiway 41 east onto Taxiway L only occurs in two operating configurations: Visual Flight Rules (VFR) Parallel 27s (Exhibit 2) and Instrument Flight Rules (IFR) Parallel 27s (Exhibit 5). There is no operating configuration in Phase 1 that would allow a turn from Taxiway L south onto Taxiway 41. While the potential for an aircraft to make this turn exists, the vast majority of aircraft taxiing through this intersection are freighters taxiing on Taxiway 41 straight through to the South Cargo Area. The most likely potential for an impact is an A380 taxiing to depart from Runway 28R; however, only 1.4 A380s are projected to possibly utilize this intersection per day.

Intersection of Taxiway 69/Taxiway 41

The movements with the potential to impact the RVR and Glide Slope near this intersection are an aircraft turning from Taxiway 41 east onto Taxiway 69 (designated on Exhibits 1-6 as FXN to FXE) or an aircraft turning from Taxiway 69 south onto Taxiway 41 (designated on Exhibits 1-6 as FXW to FXS). **Table 6** shows the fleet mix projected to utilize the intersection annualized over all operating configurations. The aircraft types expected to be in the vicinity are wide body cargo planes, including the B747-100/200 Freighter, which makes up 44% of the projected fleet utilizing the intersection. The total number of aircraft passing through the intersection is very small at 19.2 aircraft per day.

TAAM Simulation shows that the potential for an aircraft to turn from Taxiway 41 east onto Taxiway 69 only occurs in two operating configurations:VFR 3 Parallel 9s (Exhibit 3) and VFR 4 Parallel 9s (Exhibit 4). There is no operating configuration in Phase 1 that would allow a turn from Taxiway 69 South onto Taxiway 41. While the potential for an aircraft to make the turn exists, the only aircraft taxiing on Taxiway 41 through the intersection in these two configurations are freighters likely headed to the South Cargo Area.

Intersection of Taxiway 66/Taxiway 70

The movements with the potential to impact the RVR and Glide Slope near this intersection are an aircraft turning from Taxiway 70 south onto Taxiway 66 (designated on Exhibits 1-6 as SE to SS) or an aircraft turning from Taxiway 66 west onto Taxiway 70 (designated on Exhibits 1-6 as SN to SW). **Table 7** shows the fleet mix projected to utilize the intersection annualized over all operating configurations. The aircraft types expected to be in the vicinity are wide body cargo planes, including the B747-100/200 Freighter, which makes up 37% of the projected fleet utilizing the intersection. The total number of aircraft passing through the intersection is small at 43.4 aircraft per day.

As shown in Exhibits 1-6, there is no operating configuration in Phase 1 that would allow an aircraft to perform either of the two turns that might cause jet blast impact to the Glide Slope and RVR nearby. Therefore, there is no expected impact to NAVAIDs in Phase 1 under normal operations.

Intersection of Taxiway M/Taxiway T

The only movement with the potential to impact the temporary Localizer antenna array at this intersection is an aircraft turning from Taxiway M north onto Taxiway T (designated on Exhibits 1-6 as MW to MN). **Table 8** shows the fleet mix projected to utilize the intersection annualized over all operating configurations. Almost all of the aircraft types expected to be in the 2009 fleet mix pass through this intersection, although many only do so a maximum of once per day. The aircraft that is projected to represent the largest percent of the fleet mix utilizing this intersection is the Canadair Regional Jet (CRJ). This aircraft does not create breakaway jet blast and would, therefore, not impact the NAVAID. The total number of aircraft passing through the intersection is large at 974.9 aircraft per day. Of these, approximately 410 aircraft have the potential to create jet blast impact on the NAVAID.

Simulation shows that the potential for an aircraft to make a turn from Taxiway M north onto Taxiway T only occurs in two operating configurations: VFR Parallel 27s (Exhibit 2) and IFR Parallel 27s (Exhibit 5). While the potential for an aircraft to make the turn exists, the vast majority of aircraft taxiing east on Taxiway M in these two configurations are likely to be coming from the proposed West Terminal for departure from Runway 28R and, therefore,

it is not expected that any aircraft will turn north onto Taxiway T. Additionally, aircraft arriving on Runway 28C are expected to taxi back on Taxiway B and distribute to the terminal area from that taxiway. Therefore, it is not expected that aircraft will make the impacting turn under either of the two operating configurations in question in normal operating conditions for Phase 1.

Intersection of Taxiway J/ Taxiway J1

The only movement with the potential to impact the Localizer near this intersection is an aircraft turning from Taxiway J southwest onto Taxiway J1 (designated on Exhibits 1-6 as JN to JW). **Table 9** shows the fleet mix projected to utilize the intersection annualized over all operating configurations. Many of the aircraft types expected to be in the 2009 fleet mix pass through this intersection, although many only do so a maximum of once per day. The aircraft that represents the largest percent of the fleet mix is the Airbus A319, and the next most prevalent aircraft is the CRJ, which does not create breakaway jet blast and will, therefore, not impact the NAVAIDs. The total number of aircraft passing through the intersection is moderate at 310.5 aircraft per day. Of these, approximately 120.4 aircraft have the potential to create jet blast impact on the NAVAID. However, as shown in Exhibits 1-6, there are no operating configurations in Phase 1 that would allow an aircraft to perform the turn that might cause jet blast impact to the NAVAID nearby. Therefore, there is no expected impact to NAVAIDs at this intersection in Phase 1 under normal operations.

Worst Case Scenario

The taxiway routes expected in each simulated operating configuration, detailed in **Exhibits 2-6**, show that only three of the intersections, Taxiway 41/Taxiway L, Taxiway 69/Taxiway 41, and Taxiway M/Taxiway T, exhibit a potential for movements by aircraft whose jet blast could affect the NAVAIDs situated nearby. As concluded in the Expected Operating Conditions discussion above, in all three cases the expectation that such a movement could occur is either non-existent or very small. The other two intersections studied are not expected to experience any movements that might expose NAVAIDs to jet blast. Nonetheless, it is useful to examine the impact of such a turn should it occur due to unusual operating conditions or error. These movements are defined as the worst-case scenarios for this study. Each of the five intersections was investigated for the worst-case scenario aircraft turn at the intersection. The associated jet blast was plotted relative to the aft end of the aircraft and the NAVAID at the point in the turn resulting in the most significant impact.

The worst-case scenarios are discussed in the following sections. Also discussed below, for comparison, is a similar existing condition on the airfield in which an existing NAVAID is located close to an intersection on which a worst-case turning movement could subject the facility to significant jet blast levels.

Intersection of Taxiway 41/Taxiway L

The worst-case scenario would involve a B747-400 aircraft turning from Taxiway 41 east onto Taxiway L. The distance from the aft end of the aircraft to the RVR/Glide Slope is approximately 158 feet. At this distance, the height of the 35 mph jet blast is approximately 30 feet, and the height of the 50 mph jet blast is approximately 15 feet. The RVR and Glide Slope facilities, as well as any maintenance equipment, vehicles, or personnel present, would be within both the 35 mph and 50 mph jet blast contours if an aircraft were to make this turn. An aircraft turning from Taxiway L south onto Taxiway 41 would also create jet blast impacts on the RVR/Glide Slope situated nearby; however, the impacts would be less severe. The results of the analysis are shown on **Exhibit 7**.

Intersection of Taxiway 69/Taxiway 41

The worst-case scenario would involve a B747-400 aircraft turning from Taxiway 41 east onto Taxiway 69. The distance from the aft end of the aircraft to the RVR/Glide Slope is approximately 154 and 166 feet, respectively. At this distance, the height of the 35 mph jet blast is approximately 30 feet, and the height of the 50 mph jet blast is approximately 14 feet. The RVR and Glide Slope facilities, as well as any maintenance equipment, vehicles, or personnel present, would be within both the 35 mph and 50 mph jet blast contours if an aircraft were to make this turn. An aircraft turning from Taxiway 69 south onto Taxiway 41 would also create jet blast impacts on the RVR/Glide Slope situated nearby; however, the impacts would be less severe. The results of the analysis are shown on **Exhibit 8**.

Intersection of Taxiway 66/Taxiway 70

The worst-case scenario would involve a B747-400 aircraft turning from Taxiway 70 south onto Taxiway 66. The distance from the rear of the aircraft to the RVR/Glide Slope is approximately 142 feet. At this distance, the height of the 35 mph jet blast is approximately 30 feet, and the height of the 50 mph jet blast is approximately 16 feet. The RVR and Glide Slope facilities, as well as any maintenance equipment, vehicles, or personnel present, would be within both the 35 mph and 50 mph jet blast contours if an aircraft were to make this turn. An aircraft turning from Taxiway 66 west onto Taxiway 70 would also create jet blast impacts on the RVR/Glide Slope situated nearby; however, the impacts would be less severe. Based on simulation, there is no aircraft expected to make either turn in Phase 1. The results of the analysis are shown on **Exhibit 9**.

Intersection of Taxiway M/Taxiway T

The worst-case scenario would involve a B747-400 aircraft turning from Taxiway M north onto Taxiway T. This is the only turning direction at the intersection in which jet blast might affect the temporary localizer antenna array located nearby. The distance from the rear of the aircraft to the temporary Localizer antenna array is approximately 163 feet. At this distance, the height of the 35 mph jet blast is approximately 31 feet, and the height of the 50 mph jet blast is approximately 11 feet. The Localizer facilities, as well as any maintenance equipment, vehicles, or personnel present, would be within both the 35 mph and 50 mph jet blast contours if an aircraft were to make this turn. The results of the analysis are shown on **Exhibit 10**.

Intersection of Taxiway J/ Taxiway J1

The worst-case scenario would involve a B747-400 aircraft turning from Taxiway J southwest onto Taxiway J1. This is the only turning direction at the intersection in which jet blast might affect the localizer located nearby. The distance from the rear of the aircraft to the temporary Localizer antenna array is approximately 209 feet. At this distance, the height of the 35 mph jet blast is approximately 31 feet, and the height of the 50 mph jet blast is approximately 10 feet. The Localizer facilities, as well as any maintenance equipment, vehicles, or personnel present, would be within both the 35 mph and 50 mph jet blast contours if an aircraft were to make this turn. The results of the analysis are shown on **Exhibit 11**.

Existing Condition - Intersection of Taxiway U/ Runway 22R

There is an existing worst-case scenario on the airfield, shown on **Exhibit 12**: the rear of a B747-400 turning from Taxiway U onto Runway 22R would be approximately 118 feet from the RVR and approximately 132 feet from the Glide Slope associated with Runway 22R. This turn does not occur during normal operations at the Airport, indicating that NAVAIDs situated close to taxiway intersections at locations expected to be infrequently exposed to jet blast may be operationally acceptable.

Conclusion

The positions of the NAVAIDS detailed above are fixed by their functional requirement to land aircraft safely on the runways they serve. Moving NAVAIDs to a position 300 feet behind the source of jet blast may compromise this functional ability. As indicated above, there is an existing NAVAID on the airfield that is fixed by function inside the 300-foot envelope and subject to an operating environment that minimizes jet blast impacts on the facility. It is reasonable to assume that NAVAIDs, as airfield equipment, should have some tolerance for jet blast. Such tolerance could be assessed through future design efforts.

In the event that some NAVAIDs do not have the ability to withstand jet blast as expected, there may be ways to resolve these situations, such as working with air traffic controllers to restrict certain aircraft movements.

We hope you find this information use. Please feel free to contact us with any further questions or comments.

Attachments

cc: Christopher P. Arman, OMP
Finlay Graham, R&A
Paul Hanly, R&A
02-01-0215-04-4139
Read File

Table 1

Weighted Annualized - Taxiway Movement (PMAD)
Taxiway Movement Summary by Aircraft-2009 With Project

Aircraft	SN	SW	SE	SS	ME	MN	MW	MS	BE	BN	BW	LE	LN	LS	LW	LL-MM	JN	JS	JW	FXE	FXN	FXS	FXW
319					52.1	13.9	40.6		59.8	17.1	46.9						24.3	30.8	16.1				
320					28.5	7.9	23.2		29.2	5.4	23.1						9.9	13.6	6.2				
321					12.4	2.4	10.2		11.9	4.0	9.3						7.2	8.5	3.0				
332					2.3	0.7	1.6		1.5	0.1	0.8												
333					1.3	0.0	1.3		0.7		0.7												
342					0.3		0.3		0.1	0.1	0.0												
343					5.9	1.4	4.5		4.6	0.3	3.0												
346					0.3		0.3		0.1	0.1	0.1												
380												1.4	1.4		0.0								
733					12.0	2.2	11.1		13.7	5.8	13.5						4.6	6.9	4.1				
737					1.4	0.0	1.3		1.4	0.3	1.1						0.5	0.5					
738					17.2	1.6	15.6		18.3	4.7	12.0						2.4	2.4					
739					10.9	2.8	8.2		11.2	1.7	6.9						2.0	1.9	0.2				
744					4.9	0.9	4.5		4.6	0.4	3.7												
757					1.9	0.2	2.1		0.9	0.0	1.1												
763					15.8	3.5	13.1		13.5	1.5	10.1						1.1	0.9	0.2				
772					10.6	3.6	8.2		13.1	1.6	9.6						1.1	1.3	0.2				
773					1.9	0.1	2.0		1.1	0.2	1.0												
31F	0.7	0.7							0.1	0.2	0.3	0.3		0.3			0.1	0.1			0.3	0.3	
72F	1.4	1.4			0.1	0.3	0.4		0.1		0.4	0.5		0.5						0.2	0.5	0.5	0.2
74F	8.0	8.0			1.2	0.3	1.5		0.8	0.2	0.9	2.0	0.9	3.0						1.5	3.0	2.7	1.3
74M					0.3		0.3		0.3	0.1	0.3												
75F	0.7	0.7			0.0		0.0		0.0		0.0	0.3		0.3							0.3	0.3	
76F	0.7	0.7							0.7	0.7	0.0	0.3		0.3						0.2	0.3	0.2	0.2
A3F	3.6	3.6			0.2	0.1	0.3		1.0	0.7	0.3	0.8	0.1	0.8						0.6	0.8	0.8	0.5
BE30					0.1		0.1		1.1	0.8	0.4					2.9	0.4		0.4				
BE40																1.4	0.2	0.7	0.9				
BE58					0.0	0.0			0.8	0.7	0.0					1.6	0.2		0.2				
C210					0.4		0.4		0.5	0.1	0.5					1.7	0.1		0.1				
C550					1.0		1.0		1.4	0.7	0.7					2.2	0.2		0.2				
C560					0.6	0.1	0.8		1.2	0.8	0.5					4.7	0.2		0.2				
C56X					0.3		0.3		0.6	0.1	0.5					2.4	0.1	0.7	0.7				
C650					1.2	0.1	1.3		1.3	0.3	1.0					9.5	0.1		0.1				
C750					1.4	0.2	1.5		1.1	0.3	1.0					11.0	0.2		0.2				
CL60					0.2		0.2		0.3	0.1	0.3					1.6							
CR7					48.9	17.2	64.3		94.7	41.3	78.5						14.6	14.1	5.3				
CR9					9.2	9.6	18.8		20.3	14.7	23.1						3.1	1.1	2.7				
CRJ					90.8	43.5	134.2		129.7	59.1	148.5						14.9	10.4	16.3				
D1F	0.7	0.7			0.1	0.1	0.1		0.1	0.1	0.1		0.1	0.1						0.2	0.1	0.1	0.2
D8F	2.9	2.9			0.2		0.2		0.2		0.2	1.1		1.1						0.1	1.1	1.1	0.1
E140					8.7	2.1	6.8		9.2	1.7	5.5						2.2	2.2					
E145					15.7	0.3	15.4		33.8	15.2	18.3						8.5	10.0	2.6				
F2TH					0.2	0.1	0.3		0.1	0.1	0.1					2.4	0.1		0.1				
F900					0.1		0.1		0.1	0.1						1.4	0.2		0.2				
FA20					0.0		0.0		0.7	0.7	0.0					0.7	0.2		0.2				
FA50																0.2							
G2									0.1		0.1					0.7							
G4					0.2	0.0	0.3		0.1	0.1	0.1					1.6							
G5					0.6	0.0	0.6		0.3	0.2	0.2					2.7	0.2	0.7	0.9				
H25C					0.6	0.2	0.8		0.6	0.2	0.6					4.5	0.2		0.2				
LJ30									1.0	0.7	0.3					1.8	0.2		0.2				
LJ35					0.2	0.1	0.2		1.0	0.7	0.3					3.2	0.1		0.1				
LJ45									0.0		0.0					1.6	0.1		0.1				
LJ55					0.5		0.5		0.4	0.1	0.3					4.0							
M1F	2.9	2.9			0.2	0.2	0.5		0.2		0.5	0.8		0.8						0.2	0.8	0.8	0.2
M80					46.9	4.6	42.2		79.3	35.0	39.7						16.7	20.3	5.8				
M87					0.6		0.6		0.2		0.2												
Grand Total	**21.7**	**21.7**	**0.0**	**0.0**	**411.4**	**120.3**	**443.2**	**0.0**	**569.0**	**218.4**	**466.9**	**7.4**	**2.4**	**7.1**	**0.0**	**67.1**	**116.0**	**127.1**	**67.5**	**2.9**	**7.1**	**6.7**	**2.5**

Source: OMP TAAM Simulation, Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table 2

Taxiway Movement Percentages
Taxiway Movement Summary by Aircraft-2009 With Project

Aircraft	SN	SW	SE	SS	ME	MN	MW	MS	BE	BN	BW	LE	LN	LS	LW	LL-MM	JN	JS	JW	FXE	FXN	FXS	FXW
319	0.0%	0.0%	0.0%	0.0%	1.7%	0.5%	1.4%	0.0%	2.0%	0.6%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	1.0%	0.5%	0.0%	0.0%	0.0%	0.0%
320	0.0%	0.0%	0.0%	0.0%	1.0%	0.3%	0.8%	0.0%	1.0%	0.2%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.5%	0.2%	0.0%	0.0%	0.0%	0.0%
321	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.3%	0.0%	0.4%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%
332	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
333	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
342	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
343	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%	0.0%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
346	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
380	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
733	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.4%	0.0%	0.5%	0.2%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%
737	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
738	0.0%	0.0%	0.0%	0.0%	0.6%	0.1%	0.5%	0.0%	0.6%	0.2%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
739	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.3%	0.0%	0.4%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
744	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.1%	0.0%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
757	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
763	0.0%	0.0%	0.0%	0.0%	0.5%	0.1%	0.4%	0.0%	0.5%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
772	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.3%	0.0%	0.4%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
773	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
31F	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
72F	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
74F	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%
74M	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
75F	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
76F	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
A3F	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BE30	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BE40	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BE58	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
C210	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
C550	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
C560	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
C56X	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
C650	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
C750	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CL60	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CR7	0.0%	0.0%	0.0%	0.0%	1.6%	0.6%	2.2%	0.0%	3.2%	1.4%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%	0.2%	0.0%	0.0%	0.0%	0.0%
CR9	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%	0.6%	0.0%	0.7%	0.5%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
CRJ	0.0%	0.0%	0.0%	0.0%	3.0%	1.5%	4.5%	0.0%	4.3%	2.0%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.3%	0.5%	0.0%	0.0%	0.0%	0.0%
D1F	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
D8F	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E140	0.0%	0.0%	0.0%	0.0%	0.3%	0.1%	0.2%	0.0%	0.3%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
E145	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.5%	0.0%	1.1%	0.5%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%
F2TH	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
F900	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
FA20	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
FA50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
G2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
G4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
G5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
H25C	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LJ30	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LJ35	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LJ45	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LJ55	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LJ60	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
M1F	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
M80	0.0%	0.0%	0.0%	0.0%	1.6%	0.2%	1.4%	0.0%	2.7%	1.2%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.7%	0.2%	0.0%	0.0%	0.0%	0.0%
M87	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	**0.7%**	**0.7%**	**0.0%**	**0.0%**	**13.8%**	**4.0%**	**14.8%**	**0.0%**	**19.0%**	**7.3%**	**15.6%**	**0.2%**	**0.1%**	**0.2%**	**0.0%**	**2.2%**	**3.9%**	**4.3%**	**2.3%**	**0.1%**	**0.2%**	**0.2%**	**0.1%**

Source: OMP TAAM Simulation, Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table 3

Annual Taxiway Movement

Taxiway Movement Summary by Aircraft-2009 With Project

Aircraft	SN	SW	SE	SS	ME	MN	MW	MS	BE	BN	BW	LE	LN	LS	LW	LL-MM	JN	JS	JW	FXE	FXN	FXS	FXW
319	-	-	-	-	18,452	4,927	14,366		21,160	6,059	16,589	-	-	-	-	-	8,608	10,897	5,710	-	-	-	-
320	-	-	-	-	10,103	2,810	8,198		10,350	1,904	8,189	-	-	-	-	-	3,490	4,805	2,202	-	-	-	-
321	-	-	-	-	4,388	855	3,604		4,203	1,405	3,280	-	-	-	-	-	2,564	2,997	1,067	-	-	-	-
332	-	-	-	-	823	239	583		537	18	280	-	-	-	-	-	-	-	-	-	-	-	-
333	-	-	-	-	453	16	469		231	-	247	-	-	-	-	-	-	-	-	-	-	-	-
342	-	-	-	-	98	-	98		34	18	16	-	-	-	-	-	-	-	-	-	-	-	-
343	-	-	-	-	2,075	479	1,596		1,629	92	1,058	-	-	-	-	-	-	-	-	-	-	-	-
346	-	-	-	-	115	-	115		51	18	33	-	-	-	-	-	-	-	-	-	-	-	-
380	-	-	-	-	-	-	-		-	-	-	479	494	-	16	-	-	-	-	-	-	-	-
733	-	-	-	-	4,230	769	3,940		4,846	2,042	4,794	-	-	-	-	-	1,622	2,450	1,461	-	-	-	-
737	-	-	-	-	491	16	475		483	92	376	-	-	-	-	-	171	171	-	-	-	-	-
738	-	-	-	-	6,074	562	5,512		6,480	1,656	4,261	-	-	-	-	-	864	864	-	-	-	-	-
739	-	-	-	-	3,857	1,007	2,918		3,962	586	2,437	-	-	-	-	-	718	655	63	-	-	-	-
744	-	-	-	-	1,749	311	1,582		1,620	127	1,326	-	-	-	-	-	-	-	-	-	-	-	-
757	-	-	-	-	664	80	745		317	17	380	-	-	-	-	-	-	-	-	-	-	-	-
763	-	-	-	-	5,574	1,238	4,639		4,789	546	3,561	-	-	-	-	-	380	317	63	-	-	-	-
772	-	-	-	-	3,752	1,268	2,909		4,654	552	3,385	-	-	-	-	-	380	462	82	-	-	-	-
773	-	-	-	-	672	35	708		387	54	369	-	-	-	-	-	-	-	-	-	-	-	-
31F	256	256	-	-	-	-	-		34	63	98	98	-	98	-	-	18	18	-	-	98	98	-
72F	512	512	-	-	33	98	131		49	-	147	179	-	179	-	-	-	-	-	63	179	179	63
74F	2,819	2,819	-	-	424	100	525		280	55	325	718	327	1,045	-	-	-	-	-	527	1,045	963	446
74M	-	-	-	-	115	-	115		115	18	96	-	-	-	-	-	-	-	-	-	-	-	-
75F	256	256	-	-	16	-	16		16	-	16	98	-	98	-	-	-	-	-	-	98	98	-
76F	256	256	-	-	-	-	-		239	255	16	98	-	98	-	-	-	-	-	82	98	79	63
A3F	1,281	1,281	-	-	82	18	100		337	258	98	277	18	296	-	-	-	-	-	200	296	277	182
BE30	-	-	-	-	52	-	52		374	292	150	-	-	-	-	1,036	145	-	145	-	-	-	-
BE40	-	-	-	-	-	-	-		-	-	-	-	-	-	-	479	82	239	321	-	-	-	-
BE58	-	-	-	-	17	17	-		272	239	16	-	-	-	-	558	63	-	63	-	-	-	-
C210	-	-	-	-	145	-	145		182	18	164	-	-	-	-	605	18	-	18	-	-	-	-
C550	-	-	-	-	337	-	337		513	258	255	-	-	-	-	781	82	-	82	-	-	-	-
C560	-	-	-	-	225	53	278		423	294	181	-	-	-	-	1,673	63	-	63	-	-	-	-
C56X	-	-	-	-	99	-	99		196	18	178	-	-	-	-	860	18	239	258	-	-	-	-
C650	-	-	-	-	438	18	457		444	92	370	-	-	-	-	3,347	18	-	18	-	-	-	-
C750	-	-	-	-	482	55	537		379	92	342	-	-	-	-	3,889	82	-	82	-	-	-	-
CL60	-	-	-	-	82	-	82		116	18	98	-	-	-	-	558	-	-	-	-	-	-	-
CR7	-	-	-	-	17,324	6,078	22,754		33,517	14,632	27,784	-	-	-	-	-	5,157	4,996	1,866	-	-	-	-
CR9	-	-	-	-	3,273	3,384	6,657		7,170	5,190	8,190	-	-	-	-	-	1,109	404	943	-	-	-	-
CRJ	-	-	-	-	32,139	15,405	47,511		45,897	20,906	52,554	-	-	-	-	-	5,282	3,687	5,754	-	-	-	-
D1F	256	256	-	-	34	18	53		34	18	34	-	18	18	-	-	-	-	-	63	18	18	63
D8F	1,025	1,025	-	-	64	-	64		64	-	64	375	-	375	-	-	-	-	-	18	375	375	18
E140	-	-	-	-	3,097	735	2,396		3,248	588	1,960	-	-	-	-	-	795	795	-	-	-	-	-
E145	-	-	-	-	5,557	102	5,456		11,960	5,374	6,484	-	-	-	-	-	3,018	3,546	908	-	-	-	-
F2TH	-	-	-	-	79	18	98		32	18	32	-	-	-	-	860	18	-	18	-	-	-	-
F900	-	-	-	-	18	-	18		18	18	-	-	-	-	-	479	63	-	63	-	-	-	-
FA20	-	-	-	-	17	-	17		256	239	17	-	-	-	-	239	63	-	63	-	-	-	-
FA50	-	-	-	-	-	-	-		-	-	-	-	-	-	-	63	-	-	-	-	-	-	-
G2	-	-	-	-	-	-	-		18	-	18	-	-	-	-	239	-	-	-	-	-	-	-
G4	-	-	-	-	82	16	98		53	18	50	-	-	-	-	558	-	-	-	-	-	-	-
G5	-	-	-	-	196	16	212		90	54	86	-	-	-	-	957	82	239	321	-	-	-	-
H25C	-	-	-	-	224	54	278		211	72	210	-	-	-	-	1,594	63	-	63	-	-	-	-
LJ30	-	-	-	-	-	-	-		337	239	98	-	-	-	-	621	82	-	82	-	-	-	-
LJ35	-	-	-	-	63	18	82		353	258	114	-	-	-	-	1,116	18	-	18	-	-	-	-
LJ45	-	-	-	-	-	-	-		16	-	16	-	-	-	-	558	18	-	18	-	-	-	-
LJ55	-	-	-	-	179	-	179		148	37	111	-	-	-	-	1,418	-	-	-	-	-	-	-
LJ60	-	-	-	-	288	55	343		50	74	32	-	-	-	-	1,276	-	-	-	-	-	-	-
M1F	1,025	1,025	-	-	82	82	164		82	-	164	293	-	293	-	-	-	-	-	63	293	293	63
M80	-	-	-	-	16,585	1,639	14,946		28,069	12,386	14,044	-	-	-	-	-	5,899	7,194	2,055	-	-	-	-
M87	-	-	-	-	195	-	195		69	-	69	-	-	-	-	-	-	-	-	-	-	-	-

Source: OMP TAAM Simulation, Ricondo & Associates, Inc.

Prepared by: Ricondo & Associates, Inc.

Table 4

Jet Blast Analysis of Fleet Mix at Intersection TW 41/TW L

Aircraft	Full Aircraft Model	Jet Blast Over Navaid (Y/N)	Jet Blast Contour over Navaid
A310	Airbus A310-200	Y	Breakaway-35 mph
A319	Airbus A319	Y	Breakaway-35 mph
A320	Airbus A320 All Series	N	N/A
A321	Airbus A321	Y	Breakaway-35 mph
A330	Airbus A330-300	Y	Breakaway-35 mph
A340	Airbus A340-600 series	Y	Breakaway-35 mph
A380	Airbus A380	Y	Breakaway-35 mph
B717	Boeing B717	N	N/A
B72S	Boeing 727-200	Y	Breakaway-35 mph
B733	Boeing 737-300	Y	Breakaway-35 mph
B734	Boeing 737-400	Y	Breakaway-35 mph
B735	Boeing 737-500	Y	Breakaway-35 mph
B737	Boeing 737-100	Y	Breakaway-35 mph and 50 mph
B738	Boeing 737-800	Y	Breakaway-35 mph and 50 mph
B739	Boeing 737-900	Y	Breakaway-35 mph and 50 mph
B73G	Boeing 737-700	Y	Breakaway-35 mph and 50 mph
B73S	Boeing 737-200	Y	Breakaway-35 mph
B744	Boeing 747-400	Y	Breakaway-35 mph and 50 mph
B74M	Boeing 747-100/2003	Y	Breakaway-35 mph and 50 mph
B757	Boeing 757-200	Y	Breakaway-35 mph and 50 mph
B762/B767	Boeing 767-200	Y	Breakaway-35 mph and 50 mph
B763	Boeing 767-300	Y	Breakaway-35 mph and 50 mph
B764	Boeing 767-400	Y	Breakaway-35 mph and 50 mph
B777	Boeing 777-300	Y	Breakaway-35 mph
BE1900	Beechcraft 1900C	N/A	No Jetblast
CRJ	Canadair Regional Jet all series	N/A	No breakaway jetblast
CRJ700	Canadair Regional Jet 700	N/A	Not Available
CRJ900	Canadair Regional Jet 900	N/A	Not Avaj,ab,e
D328	Dornier 328	N/A	No Jetblast
DC9	McDonnell-Douglas DC-9-10/14/15/20 series	N/A	No Jetblast
E135	Embraer RJ 135	N/A	Only Idle Jetblast
E140	Embraer RJ 140	N/A	Only Idle Jetblast
E145	Embraer RJ 145	N/A	Only Idle Jetblast
E146	Embraer RJ	N/A	Not in Pathplanner
ERJ	Embraer RJ 135/140/145 all series	N/A	Only Idle Jetblast
F100	Fokker 100	N/A	No breakaway jetblast
MD11	McDonnell-Douglas MD-11	Y	Breakaway-35 mph and 50 mph
MD80	McDonnell-Douglas MD-80 all series	Y	Breakaway-35 mph
MD90	McDonnell-Douglas MD-90 all series	N	N/A

Source: TAAM Simulation, Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table 5

2009 Aircraft Fleet Mix at Intersection of TW 41/TW L

Aircraft	LE	LN	LS	LW	Total Aircraft Per Day	Fleet Mix Percent at Intersection
380	1.4	1.4		0.0	2.8	16.5%
31F	0.3		0.3		0.6	3.3%
72F	0.5		0.5		1.0	6.0%
74F	2.0	0.9	3.0		5.9	34.9%
75F	0.3		0.3		0.6	3.3%
76F	0.3		0.3		0.6	3.3%
A3F	0.8	0.1	0.8		1.7	9.9%
D1F		0.1	0.1		0.1	0.6%
D8F	1.1		1.1		2.1	12.5%
M1F	0.8		0.8		1.7	9.8%
Grand Total	**7.4**	**2.4**	**7.1**	**0.0**	**16.9**	**100.0%**

Source: TAAM Simulation, "Weighted Annualized-Taxiway Movement (PMAD)," Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table 6

2009 Aircraft Fleet Mix at Intersection of TW 69/TW 41

Aircraft	FXE	FXN	FXS	FXW	Total Aircraft Per Day	Fleet Mix Percent at Intersection
31F		0.3	0.3		0.6	2.9%
72F	0.2	0.5	0.5	0.2	1.4	7.1%
74F	1.5	3.0	2.7	1.3	8.4	43.9%
75F		0.3	0.3		0.6	2.9%
76F	0.2	0.3	0.2	0.2	0.9	4.7%
A3F	0.6	0.8	0.8	0.5	2.7	14.0%
D1F	0.2	0.1	0.1	0.2	0.5	2.4%
D8F	0.1	1.1	1.1	0.1	2.2	11.6%
M1F	0.2	0.8	0.8	0.2	2.0	10.5%
Grand Total	**2.9**	**7.1**	**6.7**	**2.5**	**19.2**	**100.0%**

Source: TAAM Simulation, "Weighted Annualized-Taxiway Movement (PMAD)," Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table 7

2009 Aircraft Fleet Mix at Intersection of TW 66/TW 70

Aircraft	SN	SW	SE	SS	Total Aircraft Per Day	Fleet Mix Percent at Intersection
31F	0.7	0.7			1.4	3.3%
72F	1.4	1.4			2.9	6.7%
74F	8.0	8.0			15.9	36.7%
75F	0.7	0.7			1.4	3.3%
76F	0.7	0.7			1.4	3.3%
A3F	3.6	3.6			7.2	16.7%
D1F	0.7	0.7			1.4	3.3%
D8F	2.9	2.9			5.8	13.3%
M1F	2.9	2.9			5.8	13.3%
Grand Total	**21.7**	**21.7**	**0.0**	**0.0**	**43.4**	**100.0%**

Source: TAAM Simulation, "Weighted Annualized-Taxiway Movement (PMAD)," Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table 8

2009 Aircraft Fleet Mix at Intersection of TW M/TW T

Aircraft	ME	MN	MW	MS	Total Aircraft Per Day	Fleet Mix Percent at Intersection
319	52.1	13.9	40.6		106.6	10.9%
320	28.5	7.9	23.2		59.6	6.1%
321	12.4	2.4	10.2		25.0	2.6%
332	2.3	0.7	1.6		4.6	0.5%
333	1.3	0.0	1.3		2.6	0.3%
342	0.3		0.3		0.6	0.1%
343	5.9	1.4	4.5		11.7	1.2%
346	0.3		0.3		0.6	0.1%
733	12.0	2.2	11.1		25.3	2.6%
737	1.4	0.0	1.3		2.8	0.3%
738	17.2	1.6	15.6		34.3	3.5%
739	10.9	2.8	8.2		22.0	2.3%
744	4.9	0.9	4.5		10.3	1.1%
757	1.9	0.2	2.1		4.2	0.4%
763	15.8	3.5	13.1		32.4	3.3%
772	10.6	3.6	8.2		22.4	2.3%
773	1.9	0.1	2.0		4.0	0.4%
72F	0.1	0.3	0.4		0.7	0.1%
74F	1.2	0.3	1.5		3.0	0.3%
74M	0.3		0.3		0.6	0.1%
75F	0.0		0.0		0.1	0.0%
A3F	0.2	0.1	0.3		0.6	0.1%
BE30	0.1		0.1		0.3	0.0%
BE58	0.0	0.0			0.1	0.0%
C210	0.4		0.4		0.8	0.1%
C550	1.0		1.0		1.9	0.2%
C560	0.6	0.1	0.8		1.6	0.2%
C56X	0.3		0.3		0.6	0.1%
C650	1.2	0.1	1.3		2.6	0.3%
C750	1.4	0.2	1.5		3.0	0.3%
CL60	0.2		0.2		0.5	0.0%
CR7	48.9	17.2	64.3		130.4	13.4%
CR9	9.2	9.6	18.8		37.6	3.9%
CRJ	90.8	43.5	134.2		268.6	27.5%
D1F	0.1	0.1	0.1		0.3	0.0%
D8F	0.2		0.2		0.4	0.0%
E140	8.7	2.1	6.8		17.6	1.8%
E145	15.7	0.3	15.4		31.4	3.2%
F2TH	0.2	0.1	0.3		0.6	0.1%
F900	0.1		0.1		0.1	0.0%
FA20	0.0		0.0		0.1	0.0%
G4	0.2	0.0	0.3		0.6	0.1%
G5	0.6	0.0	0.6		1.2	0.1%
H25C	0.6	0.2	0.8		1.6	0.2%
LJ35	0.2	0.1	0.2		0.5	0.0%
LJ55	0.5		0.5		1.0	0.1%
LJ60	0.8	0.2	1.0		1.9	0.2%
M1F	0.2	0.2	0.5		0.9	0.1%
M80	46.9	4.6	42.2		93.7	9.6%
M87	0.6		0.6		1.1	0.1%
Grand Total	**411.4**	**120.3**	**443.2**	**0.0**	**974.9**	**100.0%**

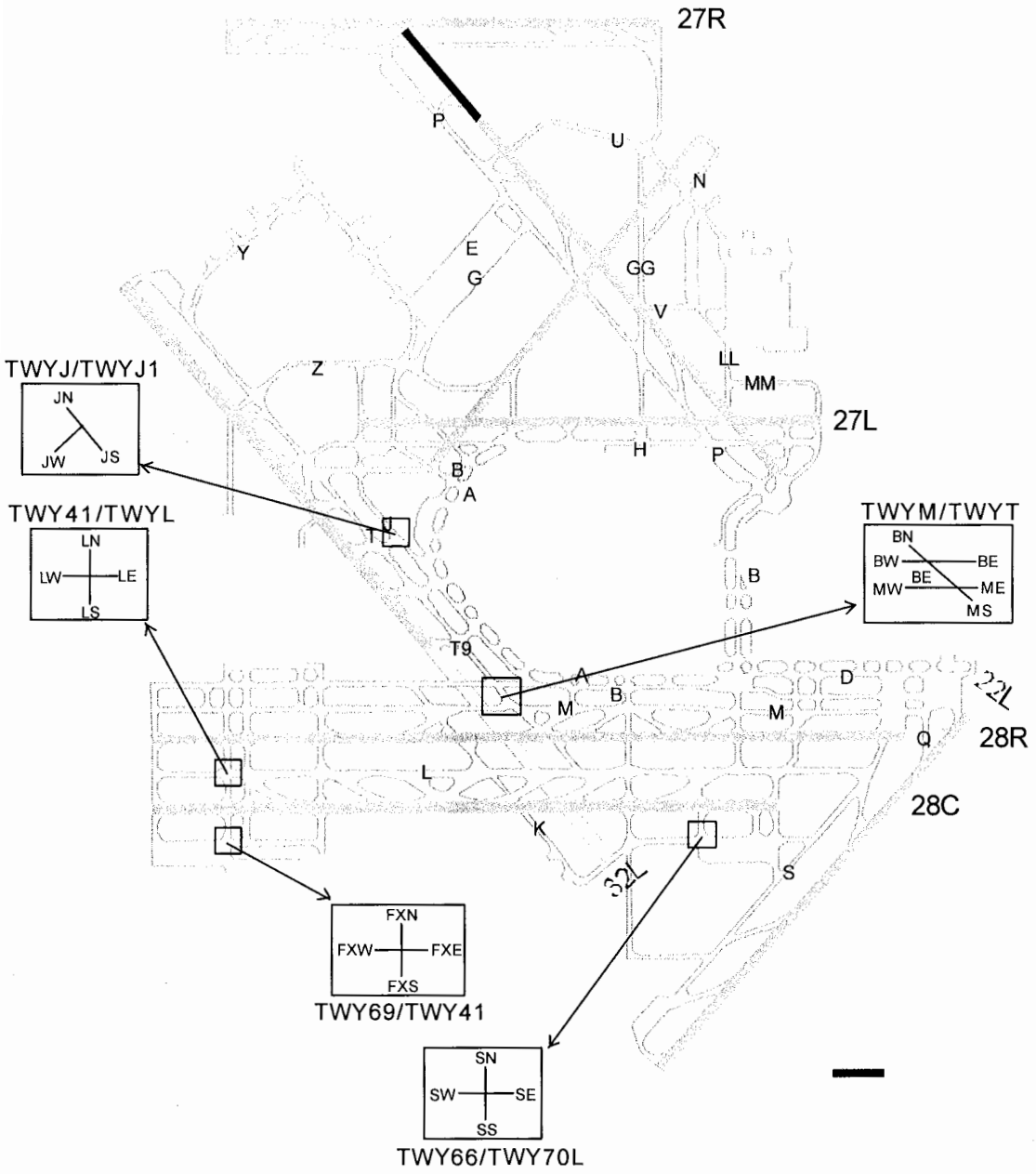
Source: TAAM Simulation, "Weighted Annualized-Taxiway Movement (PMAD)," Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table 9

2009 Aircraft Fleet Mix at Intersection of TW J/ TW J1

Aircraft	JN	JS	JW	Total Aircraft Per Day	Fleet Mix Percent at Intersection
319	24.3	30.8	16.1	71.2	22.9%
320	9.9	13.6	6.2	29.7	9.6%
321	7.2	8.5	3.0	18.7	6.0%
733	4.6	6.9	4.1	15.6	5.0%
737	0.5	0.5		1.0	0.3%
738	2.4	2.4		4.9	1.6%
739	2.0	1.9	0.2	4.1	1.3%
763	1.1	0.9	0.2	2.2	0.7%
772	1.1	1.3	0.2	2.6	0.8%
31F	0.1	0.1		0.1	0.0%
BE30	0.4		0.4	0.8	0.3%
BE40	0.2	0.7	0.9	1.8	0.6%
BE58	0.2		0.2	0.4	0.1%
C210	0.1		0.1	0.1	0.0%
C550	0.2		0.2	0.5	0.1%
C560	0.2		0.2	0.4	0.1%
C56X	0.1	0.7	0.7	1.5	0.5%
C650	0.1		0.1	0.1	0.0%
C750	0.2		0.2	0.5	0.1%
CR7	14.6	14.1	5.3	34.0	10.9%
CR9	3.1	1.1	2.7	6.9	2.2%
CRJ	14.9	10.4	16.3	41.6	13.4%
E140	2.2	2.2		4.5	1.4%
E145	8.5	10.0	2.6	21.1	6.8%
F2TH	0.1		0.1	0.1	0.0%
F900	0.2		0.2	0.4	0.1%
FA20	0.2		0.2	0.4	0.1%
G5	0.2	0.7	0.9	1.8	0.6%
H25C	0.2		0.2	0.4	0.1%
LJ30	0.2		0.2	0.5	0.1%
LJ35	0.1		0.1	0.1	0.0%
LJ45	0.1		0.1	0.1	0.0%
M80	16.7	20.3	5.8	42.8	13.8%
Grand Total	**116.0**	**127.1**	**67.5**	**310.5**	**100.0%**

Source: TAAM Simulation, "Weighted Annualized-Taxiway Movement (PMAD)," Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

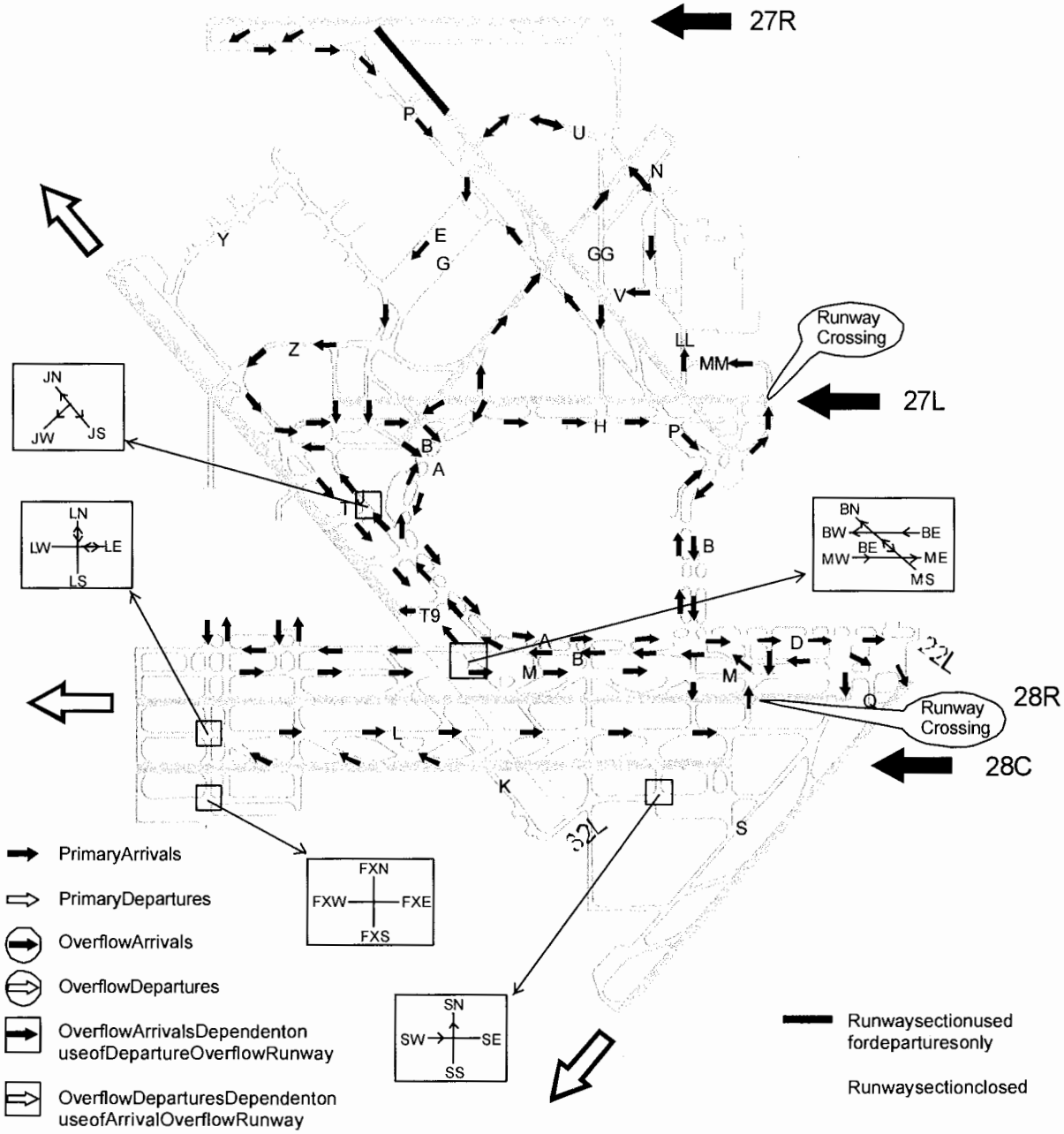


Sources:O'HareAirTrafficWorkgroup
Preparedby: Ricondo&Associates,Inc.

Exhibit1

north

Jet Blast Study
Phase 1 Intersection Locations



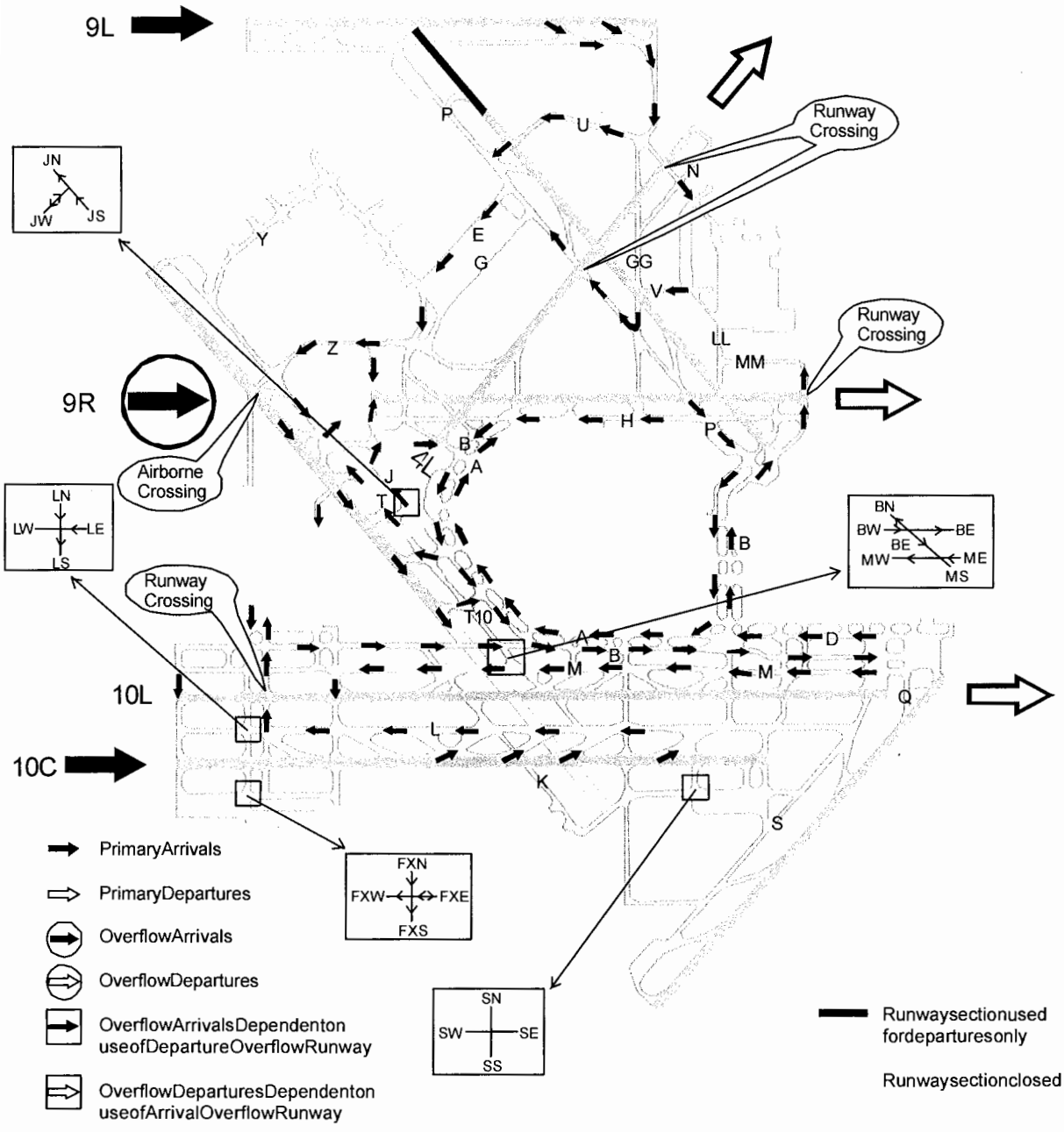
Sources:O'HareAirTrafficWorkgroup
Preparedby: Ricondo&Associates,Inc.

Exhibit2

north

ArrivalsandDepartures
DepartureQueue

Taxiway Routes
2009 With Project Airfield - VFR Parallel 27s



Sources:O'HareAirTrafficWorkgroup
Preparedby: Ricondo&Associates,Inc.

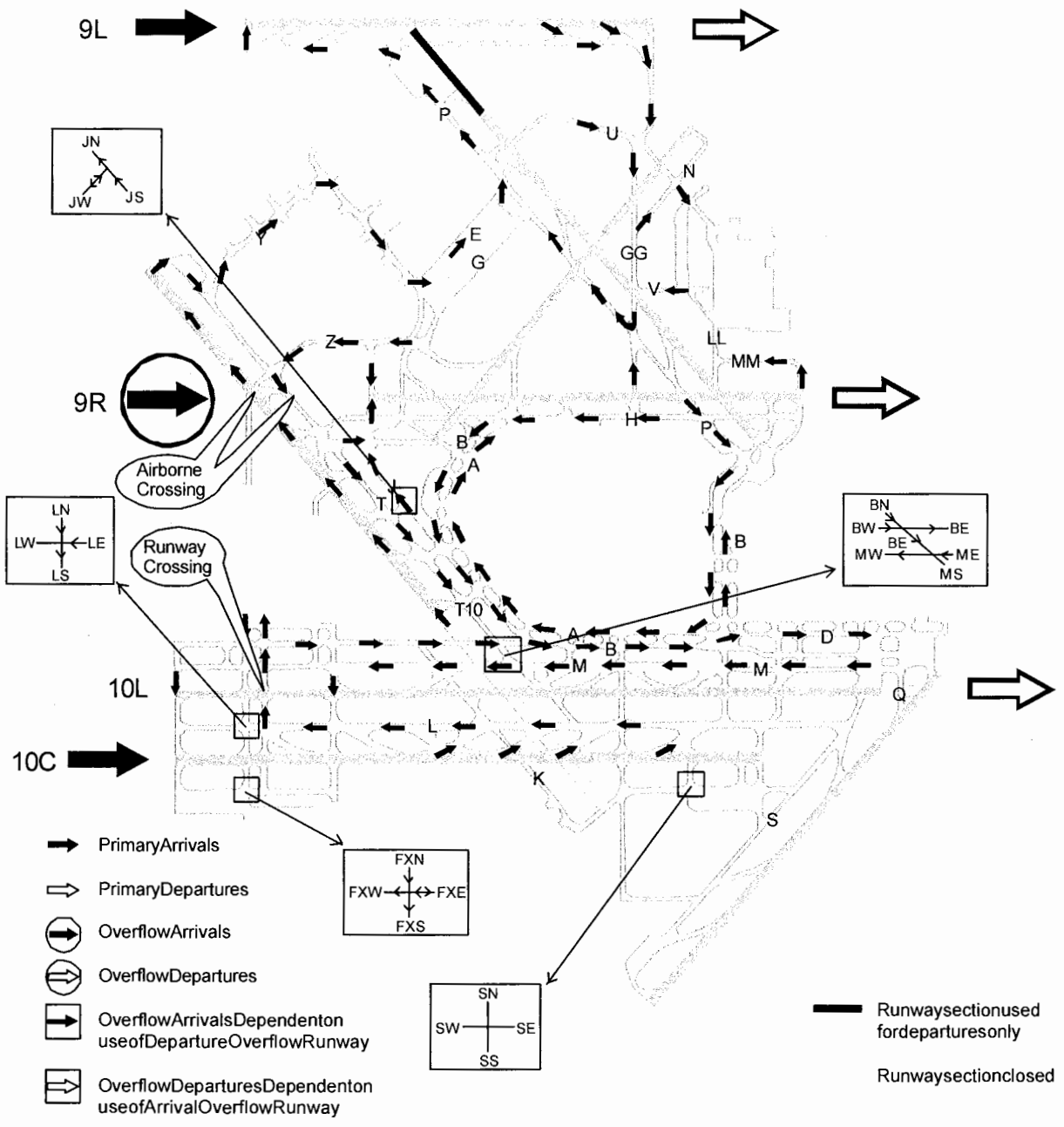
Exhibit3

north

ArrivalsandDepartures

DepartureQueue

Taxiway Routes
2009 With Project Airfield - VFR-3 Parallel 9s



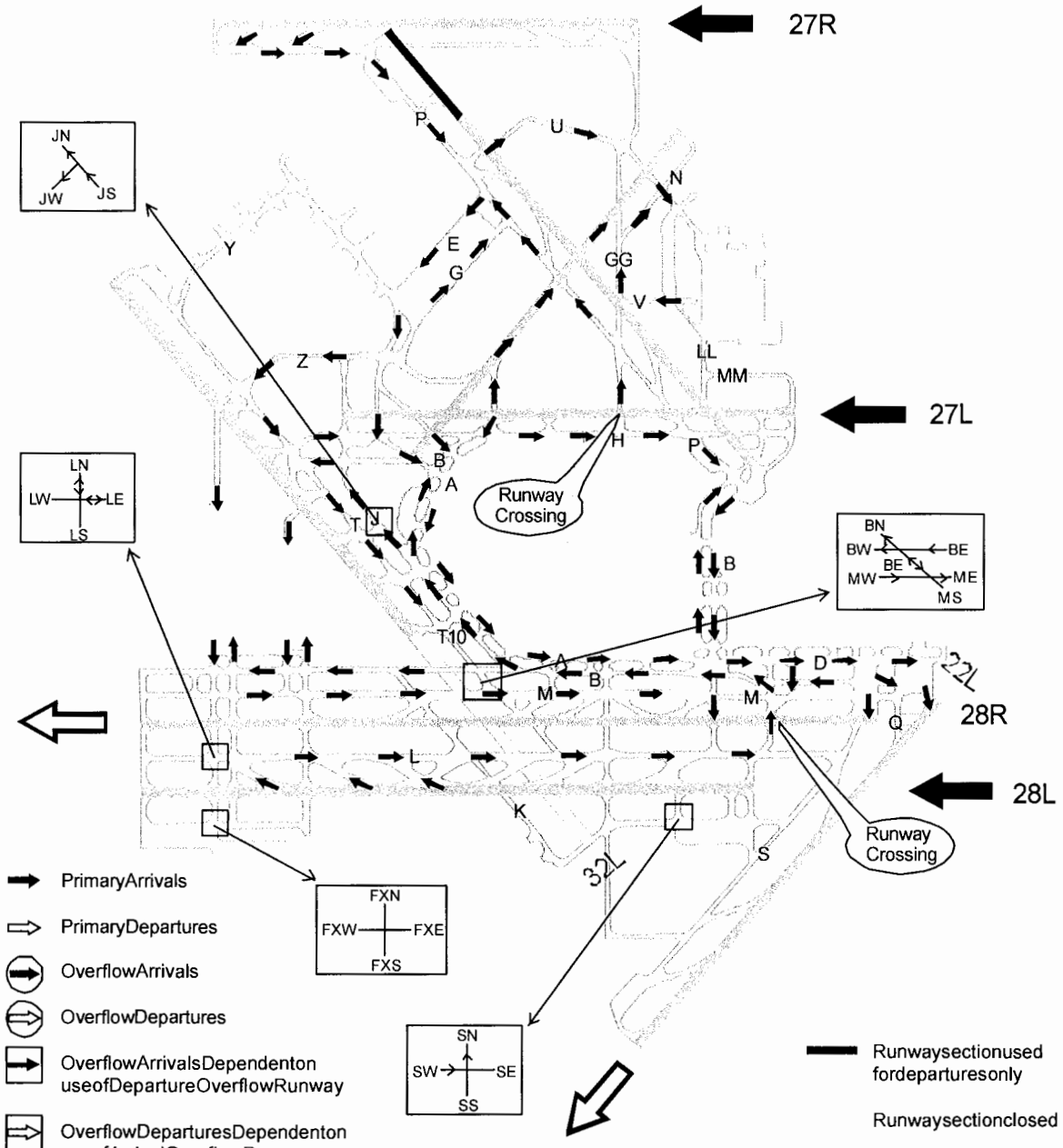
Sources:O'HareAirTrafficWorkgroup
Preparedby: Ricondo&Associates,Inc.

Exhibit4

north

ArrivalsandDepartures
DepartureQueue

Taxiway Routes
2009 With Project Airfield - VFR-4 Parallel 9s



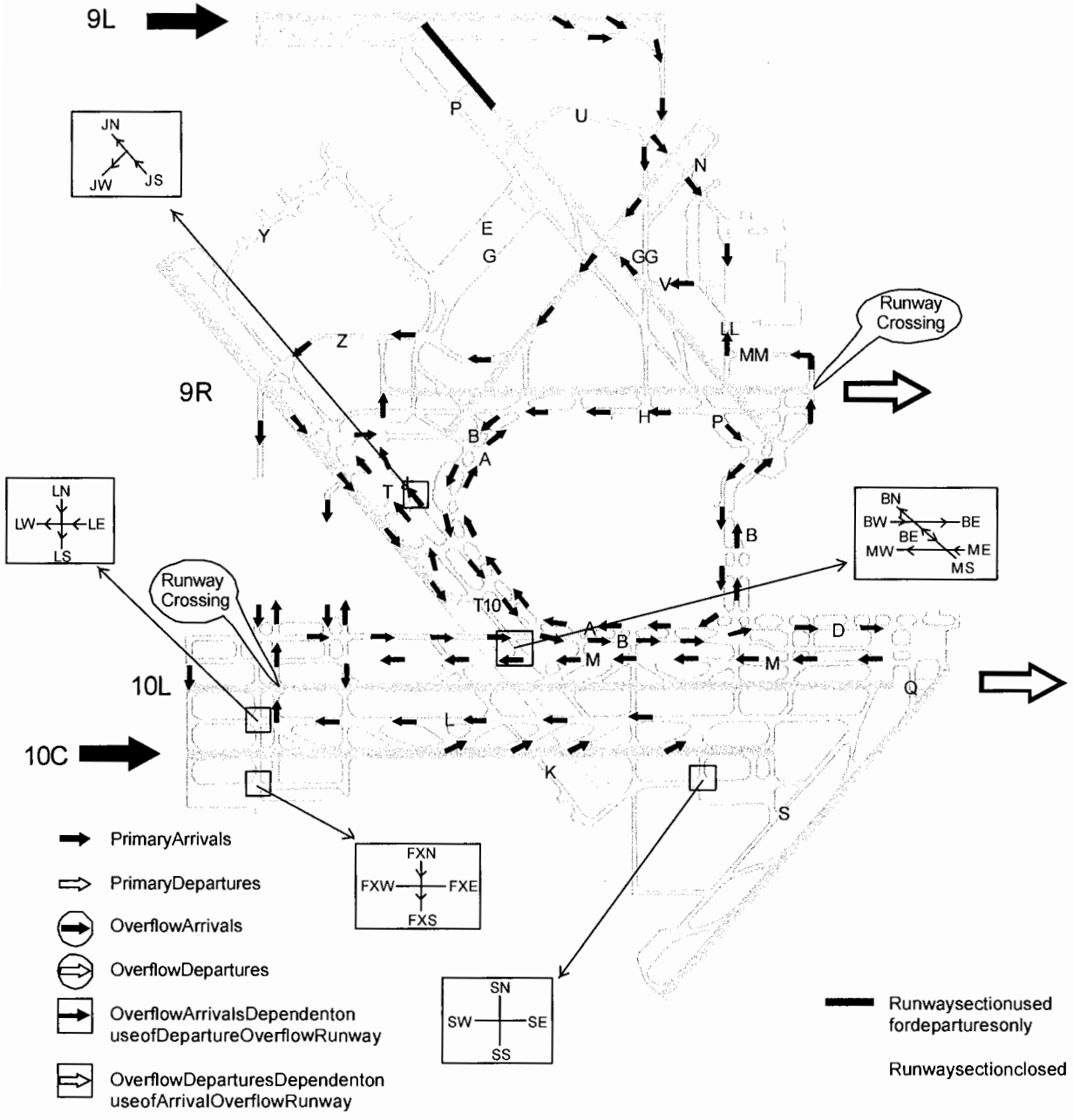
Sources:O'HareAirTrafficWorkgroup
Preparedby: Ricondo&Associates,Inc.

Exhibit5

north

ArrivalsandDepartures
DepartureQueue

Taxiway Routes
2009 With ProjectAirfield - IFR Parallel 27s



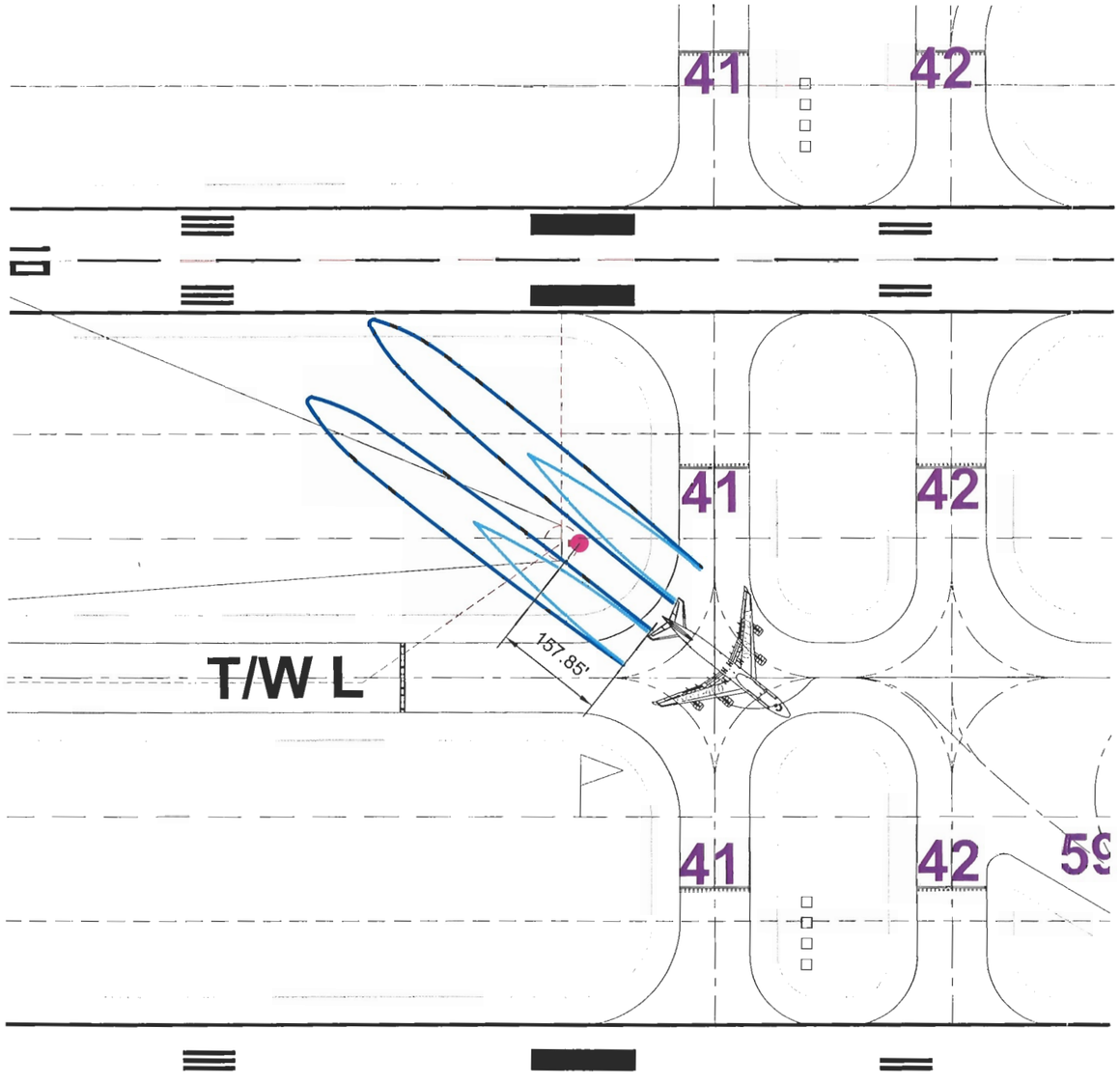
Sources:O'HareAirTrafficWorkgroup
Preparedby: Ricondo&Associates,Inc.

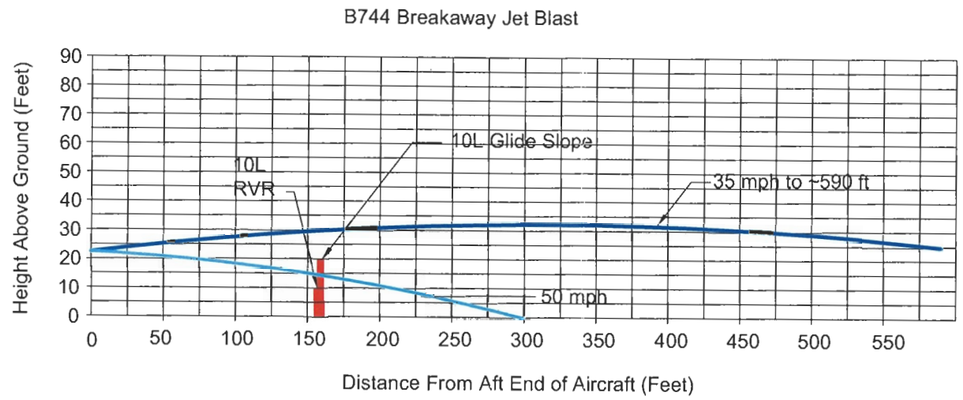
Exhibit6

north

ArrivalsandDepartures
DepartureQueue

Taxiway Routes
2009 With Project Airfield - IFR Parallel 9s





Source: Ricondo & Associates, Inc., Boeing B747-400 Airport Planning Manual
Prepared by: Ricondo & Associates, Inc.

Exhibit 7

0 200 ft.

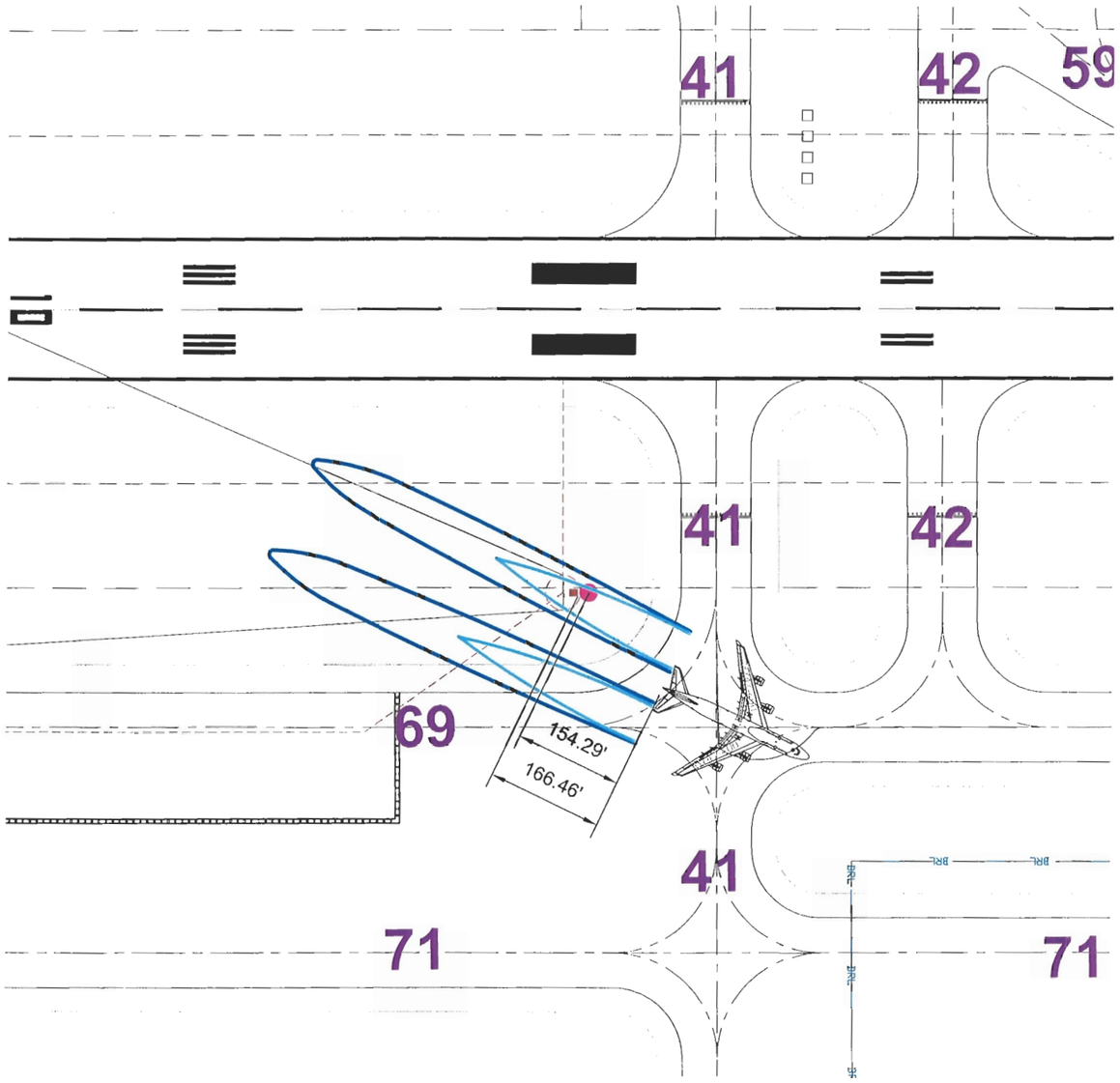
north

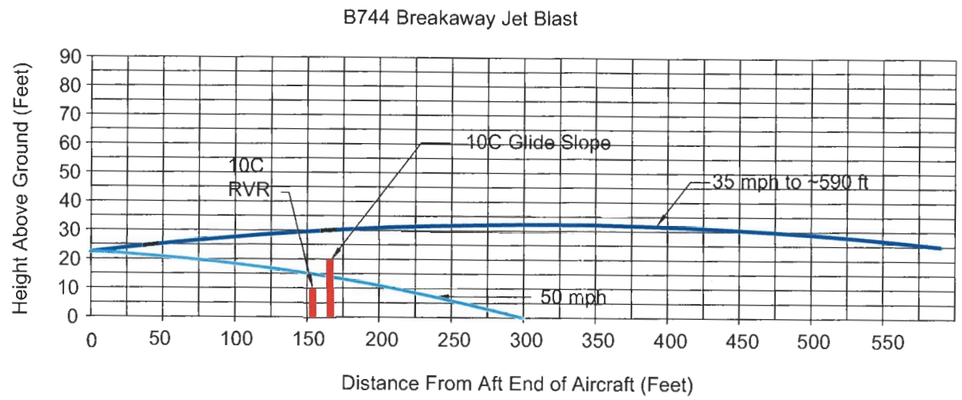
2009 Worst Case Scenario-Intersection TW 41 and TW L
B744 Jet Blast on Glide Slope and RVR

Drawing: Z:\Chicago\ORD\OMP\FAA Jet Blast Study\Jet Blast Worst Case.dwg, Layout: Intersection 1-B744, Aug 13, 2004, 11:48am

O'Hare International Airport
Jet Blast Study-Phase 1

August 2004
DRAFT





Source: Ricondo & Associates, Inc., Boeing B747-400 Airport Planning Manual
Prepared by: Ricondo & Associates, Inc.

Exhibit 8

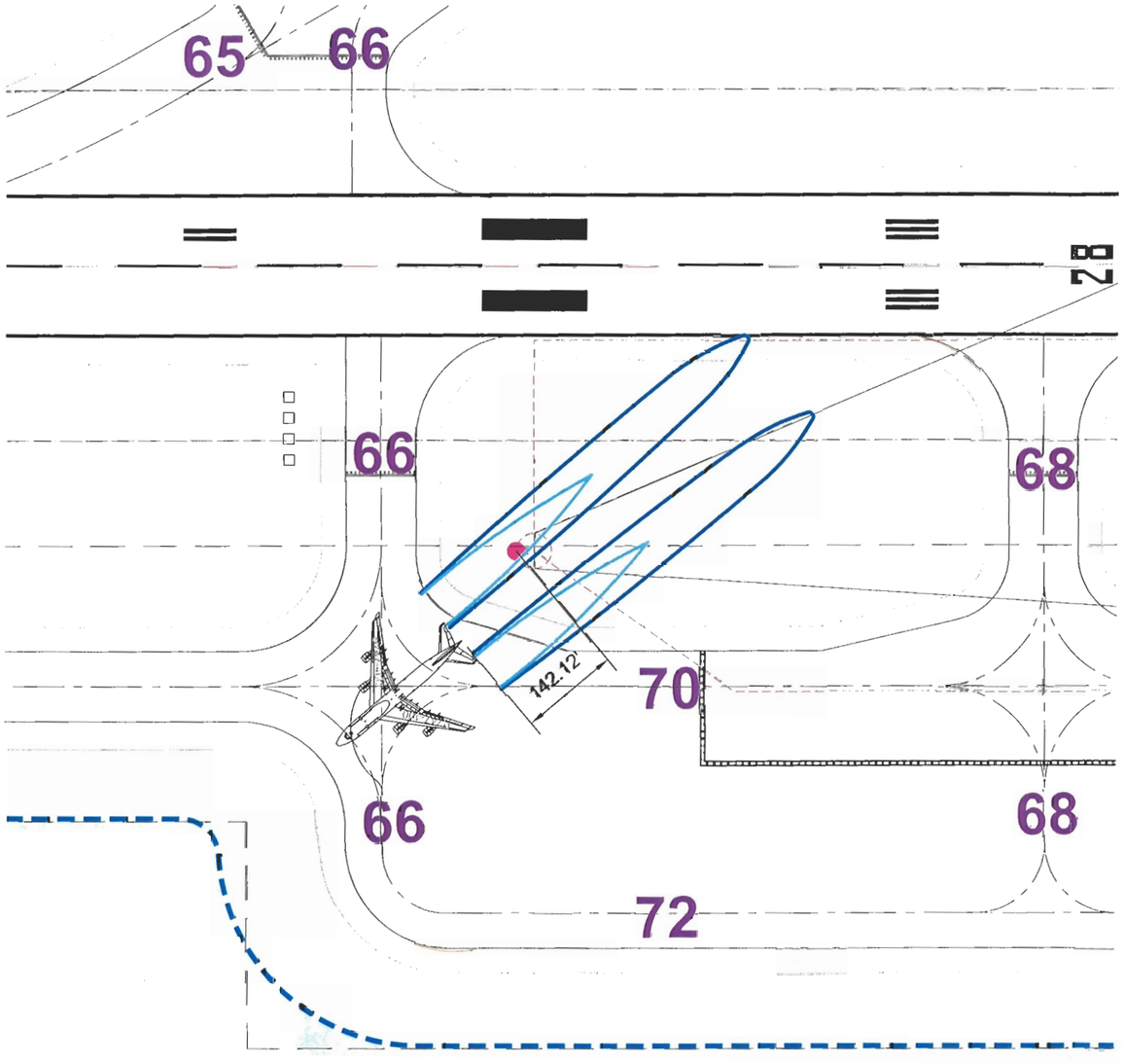
0 200 ft. north

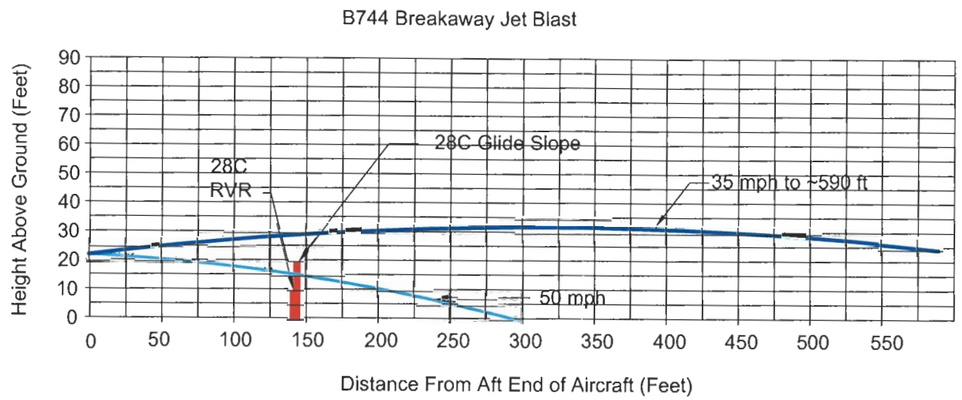
2009 Worst Case Scenario-Intersection TW 69 and TW 41
B744 Jet Blast on Glide Slope and RVR

Drawing: Z:\Chicago\ORD\OMP\FAA Jet Blast Study\Jet Blast Worst Case.dwg, Layout: Intersection 2-B744, Aug 13, 2004, 11:45am

O'Hare International Airport
Jet Blast Study-Phase 1

August 2004
DRAFT





Source: Ricondo & Associates, Inc., Boeing B747-400 Airport Planning Manual
Prepared by: Ricondo & Associates, Inc.

Exhibit 9

0 200 ft.

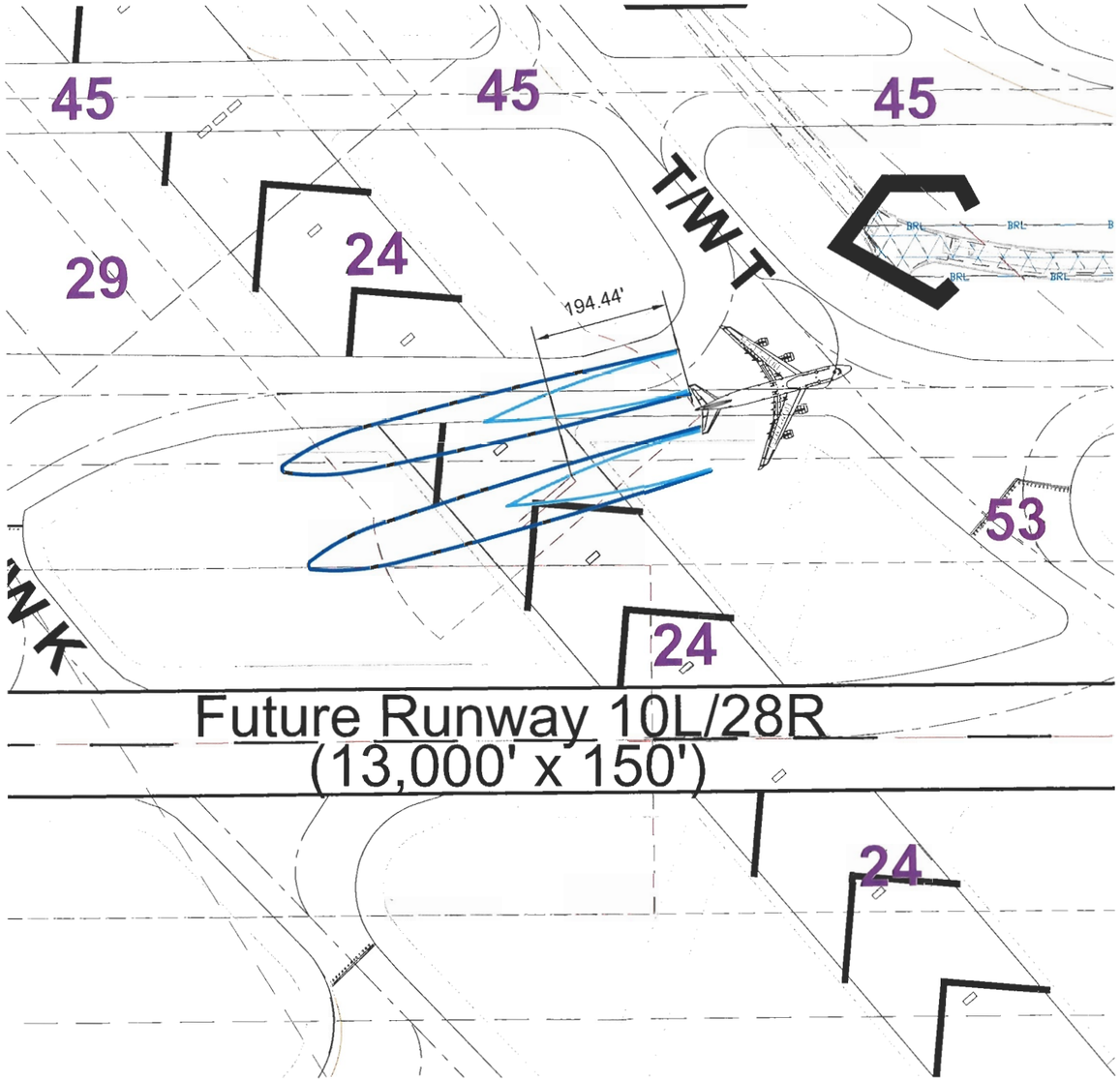
north

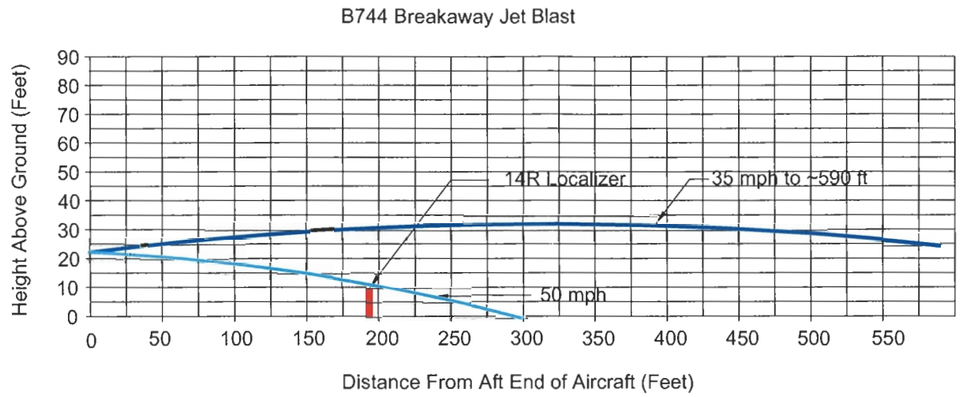
Drawing: Z:\Chicago\ORD\OMP\FAA Jet Blast Study\Jet Blast Worst Case.dwg, Layout: Intersection 3-B744, Aug 13, 2004, 11:46am

2009 Worst Case Scenario-Intersection TW 66 and TW 70
B744 Jet Blast on Glide Slope and RVR

O'Hare International Airport
Jet Blast Study-Phase 1

August 2004
DRAFT





Source: Ricondo & Associates, Inc., Boeing B747-400 Airport Planning Manual
Prepared by: Ricondo & Associates, Inc.

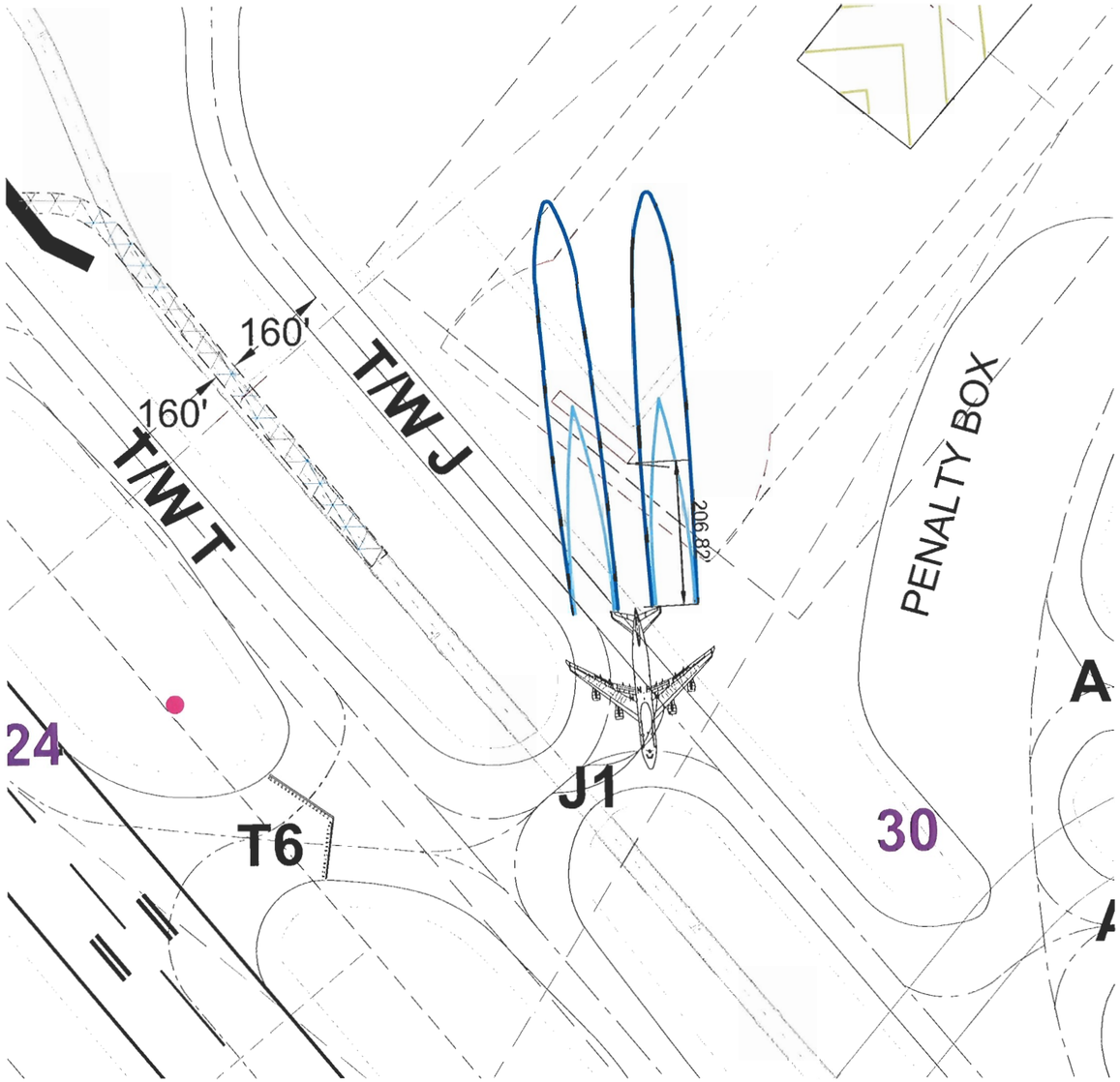
Exhibit 10

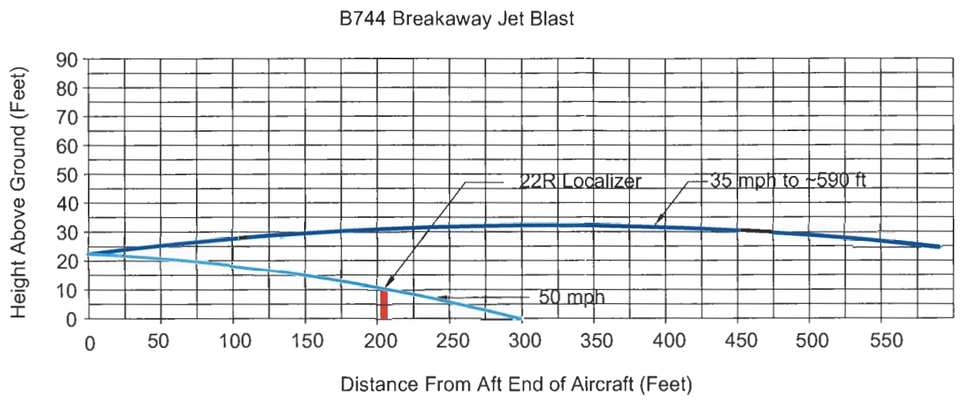
0 200 ft.

north

Drawing: Z:\Chicago\ORD\OMP\FAA Jet Blast Study\Jet Blast Worst Case.dwg, Layout: Intersection 4-B744, Aug 13, 2004, 11:47am

2009 Worst Case Scenario-Intersection TW M and TW T
B744 Jet Blast on Temporary Localizer Antenna Array





Source: Ricondo & Associates, Inc., Boeing B747-400 Airport Planning Manual
Prepared by: Ricondo & Associates, Inc.

Exhibit 11

0 200 ft.

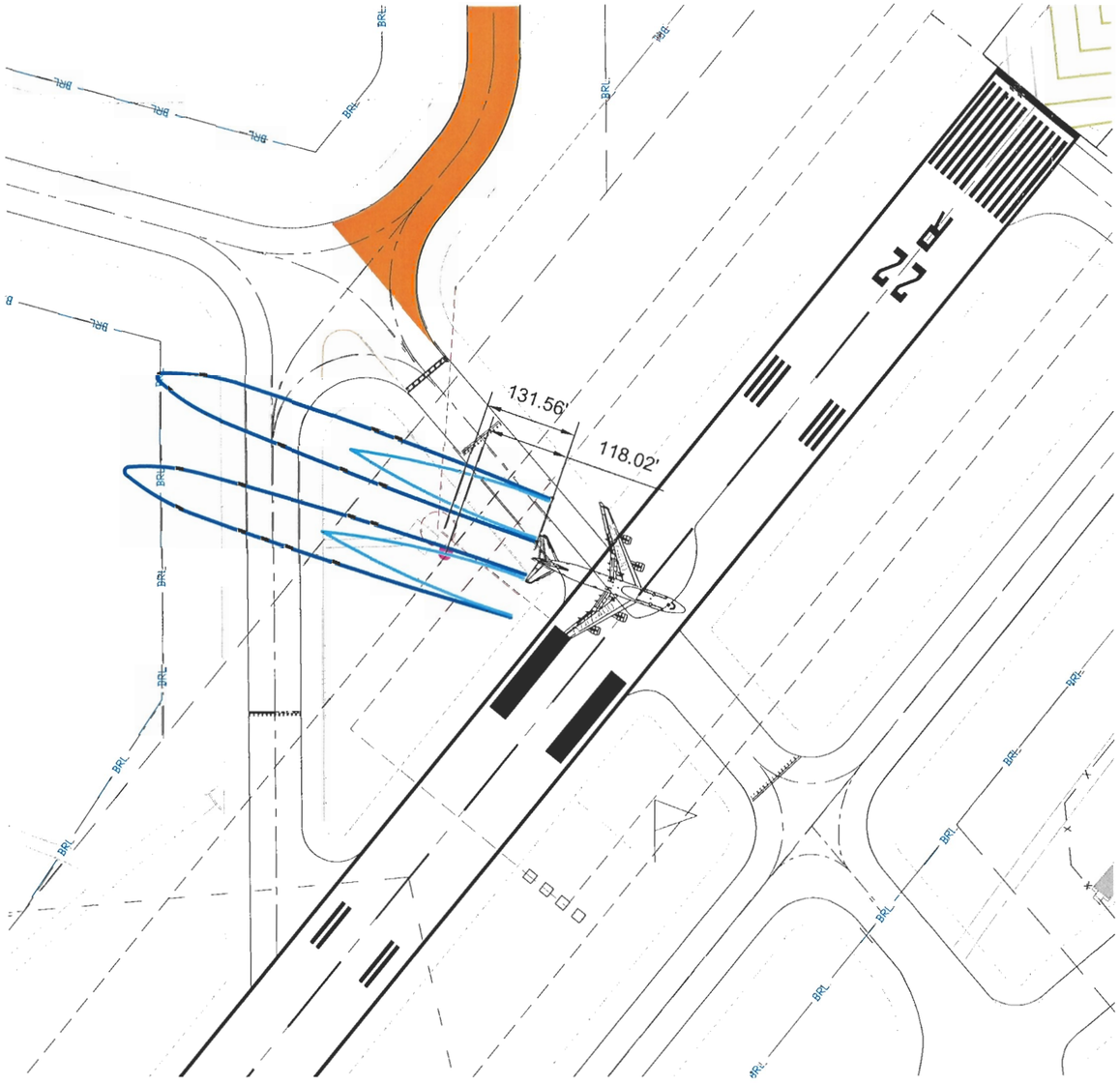
north

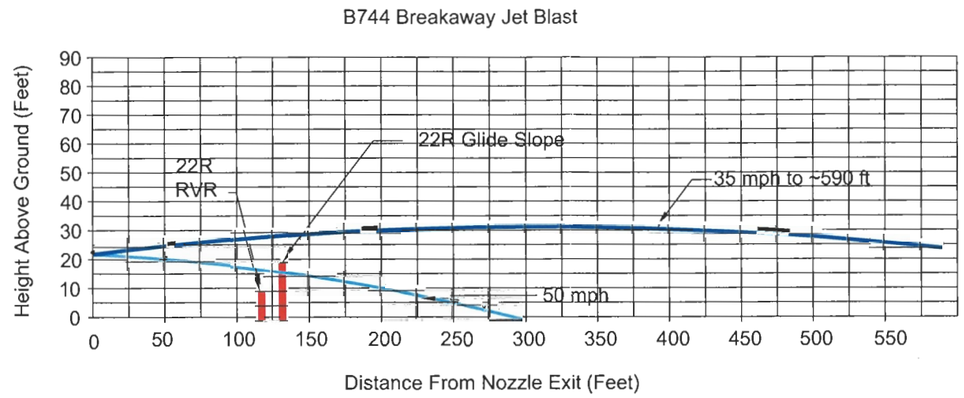
Drawing: Z:\Chicago\ORD\OMP\FAA Jet Blast Study\Jet Blast Worst Case.dwg_Layout: Intersection 5-B744_Aug 13, 2004, 11:47am

2009 Worst Case Scenario-Intersection TW J and TW J1
B744 Jet Blast on Localizer

O'Hare International Airport
Jet Blast Study-Phase 1

August 2004
DRAFT





Source: Ricondo & Associates, Inc., Boeing B747-400 Airplane Characteristics Planning Manual
Prepared by: Ricondo & Associates, Inc.

Exhibit 12

0 200 ft.

north

Existing Case Scenario-Intersection RW 22R and TW U
B744 Jet Blast on Glide Slope and RVR

Drawing: Z:\Chicago\ORD\OMP\FAA Jet Blast Study\Existing Case.dwg, Layout: Intersection 22R U - B744, Aug 13, 2004, 11:54am